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DNP Practice Inquiry Project

Evaluating the Relationship Between Tobacco Use and Pain Perception using the Global Pain
Scale (GPS) in Opioid Dependent Adults: A Retrospective Analysis

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University of Kentucky

College of Nursing

Spring 2018

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Dedication

I would like to dedicate this project to my biggest supporters: my fiancé, Stuart, and my dad, Ricky. This project is also dedicated to Reneé, Alyssa, Kyle, and the rest of my family who have endured me after many sleepless nights over the past three years. Thank you for your love, patience and unwavering support. I would have never made it to this point without each of you. This is for you, Mom- I know you were with me every step of the way.

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Abstract

Background: Chronic pain, smoking, and opioid use, contribute to a significant economic burden in the United States. Chronic pain affects all aspects of life, and is influenced by the use of cigarettes and opioids alike. Researchers suggest that there is a higher use of cigarettes and opioids in individuals with chronic pain. Chronic pain can promote smoking and smokers are more likely to use opioids. With the evidence that patients who smoke a higher number of cigarettes per day report higher pain, it is possible that smoking may be a stress-reducing behavioral response related to pain. Moreover, higher frequency and intensity of pain, can contribute to a higher dose of opioid therapy. Hence, it is critical to understand smoking behaviors and opioid use in managing pain among those with chronic pain.

Purpose: The purpose of this project was to examine the relationship between smoking and opioid use in managing pain among patients at a chronic pain management clinic.

Methods: This project was a single-center, retrospective chart review to evaluate the relationship between smoking, chronic pain, and the use of opioids. The project was conducted over a six-month time frame (from June 1, 2017- November 30, 2017) and the sample consisted of 37 subjects: 7 smokers and 30 non-smokers. Information on smoking history, opioid medication use, and perceived pain using the Global Pain Scale (GPS) was obtained from attendants at a pain clinic. A two-sample t-test was used to compare differences in average pain scores and morphine milligram equivalent (MME) for opioid use between smokers and non-smokers.

Results: The average pain rating for the entire project population (n=37) was six, with an average GPS score of 31. The average acceptable pain level was five. When the data was analyzed separately, smokers were found to have an average GPS score of 30 and an average pain rating of 6.7/10, while non-smokers were found to have an average GPS of 21

and an average pain score of 6/10; but these differences were not statistically significant.

The MME was higher for smokers than for non-smokers (26.4mg MME vs. 21.9mg MME), but these differences were not statistically significant.

Conclusion: Patients with chronic pain who smoke have a higher pain rating compared to non-smokers, therefore, possibly requiring higher use of opioids. Providers are encouraged to use evidence-based smoking cessation treatment to assist their patients who smoke. To improve overall patient health, patient experience, and quality of life, providers should screen, advise, and counsel patients with chronic pain to abstain from smoking, which may ultimately result in decreased opioid need and use.

Keywords: Smoking, chronic pain, opioids

A Retrospective Analysis Evaluating the Relationship Between Tobacco use and Pain Perception using the Global Pain Scale (GPS) in Opioid Dependent Adults

Background

Chronic pain and tobacco use are prevalent healthcare issues faced by primary care providers. Tobacco use is the leading cause of preventable death in the United States, resulting in an estimated 480,000 deaths and \$19 billion spent on health care annually (Nguyen, 2016). Similarly, chronic pain, when treated with opioids has been associated with opioid misuse and contributes to the problem of opioid addiction (Gaskin & Richard, 2012). There is developing evidence that a relationship between cigarette smoking and opioids exists. Young-Wolff et al., (2017) suggests there is a higher use of cigarettes and opioids in individuals with chronic pain. The purpose of this project was to examine the relationship between smoking and prescribed opioids among patients with chronic pain..

Chronic pain has been found to coincide with increased smoking behavior (Zale et al., 2016; Young-Wolff et al., 2017). Despite extensive research, little is known about this relationship. Though nicotine and opioids share a similar addiction pathway within the brain, how this manifests remains in question. However, it is clear that Kentucky ranks higher than the national average in both tobacco and opioid use, therefore healthcare providers must address both forms of addiction (Nguyen, 2016).

Addiction

Addiction is based on the principle of pleasure to the extent that it can alter the structure and function of the brain (Volkow & Morales, 2015). The reward center of the brain is the ventral tegmental area (VTA) located in the brainstem. The VTA is a dopamine-producing area strongly associated with motivation and reward. Dopamine creates a pleasing and enjoyable

sensation, hence, a dopamine producing action (ie smoking, gambling) can easily become habitual (Sutherland et al., 2016). Over time, exposure to an addictive substance or behavior can alter the brain chemistry, requiring more dopamine to achieve the same “high” effect.

Nicotine, the psychoactive substance in tobacco products, acts on acetylcholine receptors and potentiates a release of dopamine in the brain (Abburi et al., 2017). This release of dopamine can result in anti-nociceptive properties, thereby exhibiting an analgesic effect in the body (Abburi et al., 2017; Goesling et al., 2015). In a similar fashion, chronic pain relief from opioids can lead to abuse when it hijacks the reward circuitry of the brain, increasing the reliance on opioids as a means to ameliorate pain. Addiction to opioids is characterized by the inability to abstain from the substance. This increasing reliance on opioids leads to dependence, a physiological need to take the drug, accompanied by tolerance, requiring a higher dose to achieve the same effect. Without continual use of the substance, withdrawal symptoms can occur. Opioid addiction can include physical dependence, but there is a dysfunction in emotional response resulting in compulsive substance use despite harm (Goesling et al., 2015).

Tobacco Use

Smoking is the leading cause of preventable death in the United States with an economic health burden of \$19 billion (Nguyen, 2016; USDHHS, 2014). In Kentucky, twenty-six percent of adults use tobacco, ranking second in the nation for prevalence of tobacco use, behind West Virginia at 26.9 percent (Odani et al., 2018). Tobacco use is an addictive behavior causing damage to nearly every organ in the body. It contributes to many health problems including respiratory and cardiovascular disease, stroke, and cancer (Odani et al., 2018; USDHHS, 2014).

Nicotine impairs blood flow and oxygenation to tissues at the cellular level. Furthermore, nicotine has also been shown to accelerate intervertebral disc degeneration resulting in higher instance of chronic back pain (Young-Wolff et al., 2017). Although the nicotine in tobacco products may have some analgesic effect on pain, the other constituents of tobacco products are known to have severe detrimental effects on most body systems, which can result in chronic pain (USDHHS, 2014). Evidence suggests the link between pain and smoking can be associated with more intense pain and pain interference (Goesling et al., 2015).

Tobacco Quit Strategies

Healthcare providers (HCP) have been strongly encouraged to address nicotine use at every healthcare visit (Kruger et al., 2016). The 5 A's is a behavioral counseling framework used to engage patients in tobacco treatment (Laschober et al., 2015 & Aveyard et al., 2012). The acronym helps guide HCPs to: *ask* patients about their tobacco use, *advise* them to quit, *assess* willingness to quit, *assist* in quitting, and *arrange* for follow-up contact. Implementing this technique may help guide providers to engage patients in tobacco cessation strategies.

Researchers also suggest that providers should take environmental, cognitive and behavioral factors into account when developing a plan of care for patients who smoke (Laschober et al., 2015). Using the 5 A's as a brief intervention by a medical provider can increase quit attempts for patients in diverse clinical settings (Kruger et al., 2016; Laschober et al., 2015).

There are seven FDA approved medications (Varenicline, Bupropion, nicotine patch, nicotine gum, nicotine lozenge, and nicotine nasal spray) that have been shown to increase the success of a smoking cessation attempt. When behavioral therapy is combined with Nicotine Replacement Therapy (NRT), the success of smoking cessation is optimized (Fiore et al, 2008). The guideline used by the CDC indicates that medication plus counseling by a

healthcare provider increases the likelihood of tobacco abstinence by almost a third than if one technique was used alone (Fiore et al., 2008). Brief interventions combined with the use of smoking cessation medications can greatly improve tobacco cessation among patients in primary care settings (Fiore et al., 2008; Aveyard et al., 2012).

Opioid use

Opioids have had a long history for management of both acute and chronic pain. Unfortunately, opioids have been misused by those without chronic pain resulting in addiction. In 2016, Kentucky reported 33.1 per 100,000 deaths related to the misuse of opioids. This was significantly higher than the national average of 16.3 per 100,000 deaths (Hedegaard, Warner & Minino, 2017). While morphine was the most common detectable substance related to overdose fatalities, oxycodone accounted for 19 percent of deaths and hydrocodone accounted for 16 percent of deaths by overdose (Hedegarrd et al., 2017).

Despite the association between opioids and addiction, there is a role for opioids in the management of chronic pain. The current CDC guideline (Figure 10) recommends that HCPs first engage in nonpharmacologic therapy as the preferred treatment for chronic pain (Dowell, Haegerich, & Chou, 2016). Opioid treatment should be considered for those patients who have chronic renal failure, cannot be prescribed NSAIDs, fibromyalgia, and certain types of arthritis.

The guideline recommends that clinicians prescribe immediate release opioids at the lowest effective dosage. Morphine milligram equivalents (MME) are used to standardize the dosage of various opioids as a constant measure. Caution must be used when increasing dosages greater than 50 MME, as this puts the patient at higher risk for opioid misuse (Dowell et al., 2016). Additionally, the CDC recommends that risk factors for opioid related harms are

evaluated periodically, along with urine drug screens, and the use of the state's opioid monitoring system (Dowell et al., 2016).

Chronic Pain

Chronic pain is defined as pain lasting longer than six months and affects over 100 million Americans (IASP, 2017; Nahin, 2015). The International Association for the Study of Pain (2017) recognizes it as a multidimensional sensation. Chronic pain affects morbidity, sleep, cognition, mobility, psychosocial behaviors, and overall functional status. The most common types of chronic pain seen in primary care include low back pain, headache and pain caused by conditions such as fibromyalgia, multiple sclerosis and diabetes (Orhurhu, Pittelkow, & Hooten, 2015). It is estimated that the United States spends \$261-300 billion in healthcare costs related to chronic pain (Gaskin, & Richard, 2012). The economic burdens of managing chronic pain have a significant impact on healthcare costs in the United States.

The Global Pain Scale (GPS) is a tool used to quantify pain perception (Figure 1). There are four areas addressed in this tool regarding the patient's pain, feelings, clinical outcomes and activities. A higher number reported on the GPS is associated with a higher instance, frequency and intensity of pain. A composite score allows comparisons between visits to monitor the patient's progress and effectiveness of treatment (Gentile et al., 2011) This tool is easily administered and can be completed by the patient. The GPS was found to have high criterion validity and high construct validity in patients with chronic pain (Gentile et al., 2011).

The Kentucky All Schedule Prescription Electronic Reporting (KASPER) is an electronic system used by pharmacists and clinicians to monitor opioid prescribing (Blumenschein et al., 2010). Kentucky House Bill 1 (HB1), passed in 2012, was designed to regulate the prescribing of controlled substances and prescription drug abuse in Kentucky

(Freeman, Goodin, Troske, & Talbert, 2015). Kentucky HB1 requires all patients who are prescribed a controlled substance in the state to abide by a ‘drug contract’ signed by both the patient and the provider at the start of treatment. The agreement (Figure 3) adheres to the conditions for continual prescribing and requires an annual urine drug test, in addition to a clinical diagnosis, physical exam, behavioral screening, and a KASPER report at each visit (Freeman et al., 2015).

Using the Health Belief Model (HBM) and its constructs, a practitioner can assess what personal or environmental events prompt behavior change for the patient, thus, determining the self-efficacy and likelihood for the patient to adhere to and maintain a health promotion practice (Green & Murphy, 2014). The goal of the first construct of *perceived severity* helps the patient to understand how tobacco use contributes to chronic pain and opioid use. Through motivational interviewing, HCPs can help patients identify *perceived facilitators* and *barriers*, contributing to smoking cessation in relation to chronic pain.

Individually, smoking behavior and opioids that are prescribed for chronic pain management contribute to rising healthcare costs and patient mortality (Hooten et al., 2014). Addressing these additive problems necessitate that HCPs assess how patients use these drugs as well as their perception of the relationship of these two to each other. As these addictive problems are particularly high in Kentucky, exploring the relationship between them is of utmost importance.

Methods

Objectives/Specific aims

An urban primary care clinic developed a sub-clinic in response to the clinical treatment guidelines developed by the American Pain Association (APA). The Chronic

Opioid Analgesic Therapy (COAT) clinic was established for opioid surveillance. The COAT clinic also met the APA guidelines and Kentucky House Bill 1 regarding opioid use. Patients are seen once a month to assess and evaluate the effectiveness of their treatment. The purpose of this project was to examine the relationship between smoking and chronic pain management in patients at the COAT clinic.

The aims for this study included:

1. Examine the pain scores (using the GPS) of all patients managed in the COAT clinic, including both smokers and non-smokers.
2. Examine the differences in pain level (current pain level, GPS scores, and acceptable pain level) and opioid use (morphine equivalents) between smokers and non-smokers.

Setting

This project took place within an urban primary care clinic in a southern city. The COAT clinic was offered twice a month, had two primary providers, a physician and a nurse practitioner, as well as a registered nurse to assist the patients. Appointments lasted approximately 15 minutes and patients were given a 30-day supply of their medication via written prescription.

Population

A total of 37 male and female subjects, all over the age of 18, were enrolled in the COAT clinic. These patients had a clinically diagnosed reason for needing a controlled substance, such as tramadol or hydrocodone, to help control their pain. Inclusion criteria were: admittance into the COAT clinic between June 1, 2017- November 30, 2017, adults over the age of 18, a clinically diagnosed pain condition, and adherence to the COAT clinic

contract. Exclusion criteria were dismissal from the COAT clinic or failure to adhere to the medication contract (for example, having a positive urine drug screen).

Data Collection

A retrospective chart review was conducted over a six-month time frame: June 1, 2017-November 30, 2017. Approval from the University of Kentucky Institutional Review Board (IRB) was obtained prior to the collection of data. The data was extracted from the electronic health record and placed into a secure, web-based application. A crosswalk table was designed with 37 patient records assigned to a study number so that no patient identifying information was used during the data collection and analysis process. These study numbers replaced medical record numbers on all electronic data collection forms and electronic data used in data collection and data analysis as to protect patient privacy.

Measures

Data were collected via patient chart review. The following variables were included: demographics, smoking status, comorbidities, and pain outcomes.

Demographic variables included age (years), gender (male vs. female), co-morbidities, and diagnosis. Smoking status was based on documented self-reported current smoking (yes vs no) at each clinic visit. Four co-morbidities were evaluated based on documented clinical diagnosis: Hypertension, hyperlipidemia, diabetes mellitus (DM), and anxiety/depression. Pain medications and amount prescribed in the COAT clinic (tramadol vs. hydrocodone vs. oxycodone), pain level at the time of COAT clinic appointment (on a scale of 1-10), average GPS score (1-100), and acceptable Pain Level (on a scale of 1-10).

The average scores on the GPS, pain level at the time of appointment and acceptable pain level were determined based on scores obtained over six-time points. Opioid use was converted

to oral morphine milligram equivalent (MME) doses according to the equianalgesic dose chart used by the CDC (Table 4) (Dowell et al., 2016).

Data Analysis

Descriptive statistics, including means and standard deviations or frequency distributions, were used to summarize study variables. The variables included age, gender, smoking status (yes/no), acceptable pain level (1-10), pain level at the time of the COAT clinic appointment (1-10) and average GPS score (1-100) over the six-month time frame. Additional patient characteristics were co-morbidities, pain-related diagnoses, prescribed opioid, and side effects.

Of the 37 patients who met the inclusion criteria for this project, only seven were smokers. Data was analyzed for the entire group and then for a sub-group, comparing seven smokers to a matched sample of seven non-smokers. Therefore, the emphasis of the analysis is on descriptive statistics. MME were used as a constant to standardize the dosage of various opioids. A two-sample t-test was used to compare differences in average pain scores and MME for opioid use between smokers and non-smokers. Data analysis was conducted using SPSS, version 24 with an alpha level of .05.

Results

Sample characteristics

A total of 37 patients were identified for this project, where 19% (n=7) were identified as smokers and 81% (n=30) were non-smokers. The mean age was 62. Over half of the population was female (76%) (Table 1). The average pain rating at the time of the COAT clinic appointment for all participants (n=37) was six out of ten, with an average GPS score of 31, and the average acceptable pain level was five out of ten (see Table 1).

Clinical diagnoses included arthritis, generalized pain, Degenerative Disc Disease, arthropathy, neuropathy, cervicalgia, and other diagnoses such as May Turner syndrome and Charcot-Marie Syndrome (Figure 9). Arthritis was found to be the most common diagnosis for smokers and non-smokers. The narcotics prescribed to the patients included Tramadol 50mg, Hydrocodone 10mg, Hydrocodone 7.5mg, Hydrocodone 5mg, and Oxycodone 10mg. Side effects of pain medications included asymptomatic, constipation, drowsiness, pruritus, increased sweating, insomnia, sexual dysfunction, and fatigue. Smokers were found to have more side effects than non-smokers in the sub-group (5 vs. 3). The charting reflected two of the seven smokers were interested in smoking cessation.

In Figure 8, a list of co-morbidities is provided comparing the smokers and non-smokers. Smokers were found to have higher instance of neuropathy (29% vs 7%) and depression/anxiety (71% vs. 33%). There were no other differences in co-morbidities noted. A comparison of pain location was also explored, with smokers reporting a higher level of lower extremity pain than non-smokers (86% vs. 33%).

Smokers had higher levels of pain at the time of each appointment and higher GPS scores compared to non-smokers (Table 2). There were no differences in acceptable pain levels between smokers and non-smokers. In a similar fashion, the MME was higher for smokers as compared to non-smokers (26.4 MME vs. 21.9 MME). The relationship was not statistically significant ($p=0.42$).

Matched Control

A sub-group (n=7) was identified from the original non-smoking group (n=30) for the purpose of a matched comparison. The same sample of smokers was used when comparing these two sub-groups (Table 3). Both groups consisted of one male and six

females and had an average age of 62. Arthritis was the prominent diagnosis for both groups (nine out of fourteen).

The average MME for the smokers was 26.4 MME vs. 19.6 MME for the non-smoking sub-group. The smokers had an average GPS score of 34.2 and an acceptable pain rating of five out of ten. The non-smoking sub-group had an average GPS of 27.3 and an acceptable pain rating of six out of ten. Both groups reported a pain level of seven out of ten at the time of their COAT appointments. There was no statistical difference in any of these variables.

Discussion

Key Findings

Although the sample size was small, some of the project findings are of clinical relevance. Primarily, there were two main outcomes between smokers and non-smokers on chronic opioids, 1) smokers used higher doses of opioids and 2) there was a higher instance of anxiety and depression among smokers. The relationship between pain, smoking, and opioids is concerning and should be recognized for the potential interactions by HCPs.

The entire sample in this project mirrored demographics noted in the literature reviewed. For example, women have been found to have higher occurrence of chronic pain for a variety of reasons. Female hormones may increase pain sensitivity, and greater nerve density could result in intense pain severity in women (Young-Wolff et al., 2017). Though not included in this project, one might hypothesize that women seek healthcare more than men and therefore would have a greater likelihood of being treated for chronic pain. Hirsh et al., (2014) found that gender of both patients and providers can affect the management of chronic pain in patients.

The mean age in this sample was 62 years. From the perspective of treating chronic pain, this was not unexpected. In those under the age of 50 and under the age of 18, the use of chronic opioids is not without significant concern. The current guidelines do not address the use of opioids in the pediatric population, and concern of dependence and/or addiction has been identified (Dowell et al., 2016). Older adults have more chronic conditions that worsen with age. For example, arthritis is a common problem seen in older adults who are not always good candidates for anti-inflammatories due to chronic renal or cardiovascular issues (Malec, & Shega, 2015). Across this sample, arthritis was a primary diagnosis.

Although one-fourth of Kentuckians smoke tobacco (Odani et al., 2018), there was a low percentage of smokers in the project sample. Due to the brain's addiction pathway, concurrent opioid and smoking can influence the pain response to opioids. Though the smoking sample size in this project was small, smokers reported more pain and higher MME per day. The shared acetylcholine receptors in the opioid and nicotine addiction pathways is a potential reason for why smoking may hinder pain management (Sutherland et al., 2016).

The incidence of anxiety and depression as a co-morbid diagnosis among the patients in this sample revealed disparity between smokers and non-smokers. Independently, smokers without chronic pain have higher instances of anxiety and depression. Chronic pain is also identified with anxiety and depression, irrespective of smoking status. Therefore, when the two are combined it is not surprising to find that the smokers in this sample had a higher incidence of anxiety and depression as a comorbidity. This is supported by Ditre et al. (2015), who reported that smokers have higher anxiety in relation to chronic pain. What remains unclear is the direction of the relationship. It is possible that depression could occur as a result of chronic pain in patients with pain-smoking relations or vice versa.

Limitations

Several limitations were identified in the design and procedures of this project. The data were collected from only one clinic, limiting the generalization. Additionally, the sample population was relatively small (n=37), with only 19% of these patients identified as smokers. The population was also predominantly female (76%), which further limits the generalizability of the findings to males. Race and ethnicity were not a part of the demographic data obtained from the chart review. However, the COAT clinic predominantly serves a Caucasian population, which limits the findings across diverse ethnic backgrounds. This is a healthcare disparity among ethnicities is recognized in the literature (Tait & Chibnall, 2014).

Additionally, some patients may not have had full six data points when collecting pain data. Patients are required to see their PCP every 3-6 months, and therefore data regarding their GPS and current pain level may have been missed for months which the patient could not attend the clinic. This missing information may have skewed the results.

Recommendations for Practice

Currently, for each patient, tobacco use status is asked and readiness to quit is assessed at each COAT appointment. Though not fully investigated in this sample, providers may recognize the opportunity for brief smoking cessation intervention. It is important that all 5 A's are used together to increase effectiveness and likelihood for success (Aveyard, et al., 2012). In fact, the US Preventative Service Task Force (2015) gives a grade A recommendation advising clinicians to screen all patients for tobacco use and assess their readiness to quit. The 5 A's offer an opportunity for the provider to evaluate as well as intervene in tobacco cessation treatment (Kruger et al., 2016; Sui et al., 2016). Providers can

use motivational interviewing techniques to further explore reasons why patients might be hesitant to quit. A theoretical framework, such as the HBM, can be used to guide interview techniques to encourage patients to become self-motivated (Green & Murphy, 2014).

Information regarding smoking cessation should be provided at each visit to all current and former smokers. Exposure to this information may help patients to recognize the implications that smoking has on their health, especially in relation to their pain. For example, a teaching sheet (Figure 3), developed for this project, to inform patients how smoking affects their pain could be distributed. Distributing this teaching sheet to patients at a COAT clinic can help expose them to smoking cessation information. This sheet also provides talking points for the provider which can contribute to the overall plan of care.

The strategy used for assessing smoking cessation in the COAT clinic had patients indicate interest in smoking cessation on the intake form. Smoking cessation was to be discussed if the patient desired more information on this topic. Though this was not fully explored in the project design, one recommendation would be to assess previous quit attempts on the same intake form. This would streamline the process and conversation regarding smoking cessation.

Providers must be familiar with available resources to help patients quit tobacco use. Data has shown group or individual psychological support can help people who want to quit. This could be actualized by utilizing the 1-800-QUIT- NOW (Patel et al., 2016; Kruger et al., 2016). Moreover, NRT in combination with behavioral therapy can produce ideal outcomes regarding tobacco therapy (Fiore et al., 2008). A variety of counseling styles have helped smokers gain control over their behavior: motivational interviewing, cognitive behavioral

therapy, and acceptance and commitment therapy (Lindson-Hawley, 2015, Spears et al., 2017; Bricker et al., 2017).

Depression and anxiety among chronic pain patients, especially those who smoke, cannot be ignored. This most prevalent comorbidity is not fully addressed among its relationship between tobacco and those with chronic pain. Depression and anxiety has been found to complicate smoking cessation attempts (Zale et al., 2016). Psychiatric services should be explored and offered to all patients.

Conclusion

Many gaps still exist when addressing smokers with concurrent opioid use. In order to address these gaps, more research is needed to discover the most effective way for PCPs to encourage smoking cessation. The goal of chronic pain management is to achieve adequate pain control in patients with chronic pain. Along with a need to use the 5 A's to their highest potential, there is also a need for clinicians to understand the mechanisms between smoking and chronic pain. When providers collaborate with smokers who experience chronic pain, positive outcomes can result for all parties involved. By enhancing PCP engagement in tobacco cessation treatment in patients with chronic pain, their disproportionate tobacco disease burden can be addressed.

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Table 1. Demographic and clinical characteristics of the sample (n= 37)

Demographic	Mean (SD) or n (%)
Age	61.9 (9.0)
Gender	
Male	9 (24.3%)
Female	28 (75.7%)
Smoker	
Yes	7 (18.9%)
No	30 (81.1%)
Acceptable pain level (0-10)	5.16 (1.95)
Avg Pain at Appointment (1-10)	6.1 (2.1)
Global pain score (0-100)	30.5 (19.3)
Morphine equivalent (mg/ME/day)	22.77(13.1)

Table 2. Comparison of pain levels among smokers and non-smokers

	Smoker (n=7)	Non-smoker (n=30)	<i>p</i>
	Mean (SD)	Mean (SD)	
Pain at Appointment (1-10)	7.1 (1.7)	5.8 (2.2)	0.14
Global Pain Score (GPS) (1-100)	34.2 (17.4)	21.9 (20.1)	0.71
Acceptable Pain Level (1-100)	5.14 (1.5)	5.17 (2.1)	0.9
Morphine Equivalent (mg/ME/day)	26.4(12.8)	21.9(13.2)	0.42

Table 3. Pain Characteristics with Sub-group

Variable	Non-smoker (n=7)	Smoker (n=7)	Non-smoker (n=30)
Average Pain at Appointment (1-10)	7.0	7.1	5.8
Global Pain Score (1-100)	27.3	34.2	21.9
Acceptable Pain Level (1-10)	6	5.14	5.17
Morphine Equivalent (MME)	19.6	26.4	21.9

Table 4. Morphine Milligram Equivalent (MME) Conversion table

Medication	mg per day	Morphine Equivalent
Morphine	1	1
Hydrocodone	1	1
Oxycodone	1	1.5
Tramadol	1	0.1

Figure 1. Global Pain Scale

Global Pain Scale

Instructions: For each question, please indicate your level of pain by circling a number from 0 to 10.

YOUR PAIN:

My **current** pain isNo pain: 0 1 2 3 4 5 6 7 8 9 10 :Extreme pain

During the *past week*,
the **best** my pain has been isNo pain: 0 1 2 3 4 5 6 7 8 9 10 :Extreme pain

During the *past week*,
the **worst** my pain has been isNo pain: 0 1 2 3 4 5 6 7 8 9 10 :Extreme pain

During the *past week*,
my **average** pain has beenNo pain: 0 1 2 3 4 5 6 7 8 9 10 :Extreme pain

During the *past 3 months*,
my **average** pain has beenNo pain: 0 1 2 3 4 5 6 7 8 9 10 :Extreme pain

YOUR FEELINGS: During the past week I have felt:

Afraid.....Strongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

DepressedStrongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

TiredStrongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

AnxiousStrongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

Stressed.....Strongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

YOUR CLINICAL OUTCOMES: During the past week:

I had trouble sleepingStrongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

I had trouble feeling comfortableStrongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

I was less independent.....Strongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

I was unable to work
(or perform normal tasks)Strongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

I needed to take more medication.... Strongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

YOUR ACTIVITIES: During the past week I was **NOT** able to:

Go to the storeStrongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

Do chores in my home.....Strongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

Enjoy my friends and familyStrongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

Exercise (including walking).....Strongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

Participate in my favorite hobbiesStrongly Disagree: 0 1 2 3 4 5 6 7 8 9 10 :Strongly Agree

Scoring: Add up the total score and divide by 2. Each subset is worth 25 points. The maximum total score is 100.



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Figure 2. Teaching Sheet

Why Smoking Will Worsen Your Chronic Pain

Short-term relief from nicotine brings long-term problems

Do you look to smoking for relief from a bad back? Or aching joints? Or abdominal pain?

Cleveland Clinic is a non-profit academic medical center. Advertising on our site helps support our mission. We do not endorse non-Cleveland Clinic products or services. Think twice before lighting up that cigarette. "Nicotine-induced pain relief is short-term. Over time, smoking may actually worsen your pain," says pain management specialist Crawford Barnett, MD.



Smokers are nearly three times as likely to get lower back pain. Smoking may aggravate abdominal pain and joint pain, as well. In fact, smoking may increase pain sensitivity in general. About 18% of people in the US are smokers, according to the Centers for Disease Control and Prevention. Yet smokers make up more than 50 percent of patients who seek pain treatment.

How smoking hurts

The nicotine in tobacco can trick the body into feeling good — at first. It triggers the release of chemicals, like dopamine, which give off a satisfying, "reward" sensation. It's what makes smoking so addictive. But that same tobacco also impairs the delivery of oxygen-rich blood to bones and tissues. Decreasing blood and nutrient flow can cause degeneration, particularly in discs of the spine, which already have more limited blood flow. The result can be lower back pain and sometimes osteoporosis.

Physicians also link smoking with fatigue and slower healing, factors that make painful conditions more prominent. Researchers are exploring even more physiological reasons why smoking makes people with fibromyalgia, arthritis and other chronic pain hurt more.

"Almost everyone knows smoking can cause cancer, lung disease and cardiovascular disease," says Dr. Barnett. "But not everyone realizes that smoking can make your pain worse. To make matters worse, when smokers suffer from debilitating pain, potentially life-changing treatments may not work. "Smokers aren't the best candidates for implantable devices such as neurostimulators, which block pain sensation," says Dr. Barnett. "Smoking impairs the immune system and increases the risk of infection after surgery.

How to get Started

Dr. Barnett actively counsels patients to quit smoking. "You may look to cigarettes for help coping with pain, anxiety or stress, but there are healthier ways to do that," he says. Here's what he suggests:

- Schedule your "quit day."
- Ask your primary care doctor about medication or nicotine replacement products.
- Consider additional treatments like acupuncture or hypnosis.
- Call 1-800-QUIT-NOW for free help from trained coaches.
- Get support from family and friends, and join a support group.
- Take a walk whenever you feel the urge to smoke.

You can also start a new exercise program. Exercise activates endorphins, chemicals in the brain that can help block or lessen pain. "Quitting smoking may be one of the most significant things you can do to both improve your health and manage your pain," says Dr. Barnett.

Figure 3. COAT Clinic Contract

UK HealthCare.
 Kentucky Clinic
 University of Kentucky Chandler Medical Center
 Lexington, KY

Patient Name: _____
 Medical Record #: _____
 Patient label _____

Medication Contract

As a patient of _____
 I have agreed to use _____ (my Doctor)
 as part of my treatment for: _____ (Medication)
 _____ (insert condition).

I agree to abide by the following rules:

1. This medication, as well as other pain medications and other controlled substances will be prescribed only by my Doctor or one of the other doctors of the UK HealthCare Division of _____. I will not obtain or attempt to obtain this medication or any other pain medication or other controlled substance from any other provider.
2. I will take my medication at the dose and frequency prescribed. I will not alter my prescription.
3. I will not increase or change how I take my medication without the approval of my Doctor.
4. I will arrange for refills at the prescribed interval ONLY during regular office hours. I will not ask for refills earlier than agreed, after-hours, on holidays or on weekends.
5. I will obtain this medication and all refills only at pharmacy: _____. (name & phone number). I consent to the exchange of my personal health information between my Doctor and the pharmacy in writing or verbally.
6. I will inform my Doctor of all other medications I am taking.
7. I will inform my other health care providers that I am taking this medication and of the existence of this contract. In the event of an emergency, I will provide this same information to emergency department providers.
8. I will protect my prescriptions and medication. I understand that lost or misplaced prescriptions will not be replaced.
9. I will keep medications only for my own use and will not share them others. I will keep all medications away from children.
10. I will not use illegal or street drugs or another person's prescription.
11. I will consent to random drug screening to assure I am only taking prescribed drugs. I understand that a drug screen is a laboratory test in which a sample of my urine or blood is checked to see what drugs I have been taking.
12. I understand I must contact my Doctor by telephone if there are concerns about my health care needs, and that it may take several hours for my call to be returned. If I am having increased pain, I know my medicine or dose will not be changed until I see my doctor.
13. I will keep all my scheduled appointments. If I need to cancel my appointment, I will do so a minimum of 24 hours before it is scheduled.
14. I understand that my Doctor may stop prescribing the medications listed and may dismiss me as a patient if:
 - (a) I do not follow these rules.
 - (b) A random drug screening indicates that I have used illegal or street drugs or that I have used pain medications or controlled substances not prescribed by my Doctor or that I have not taken my medication.
 - (c) I am charged or convicted of any crime involving controlled substances.

 Patient Signature Date

 Legal Guardian Signature Date

 Provider Signature Date

NarContract 11.05.09

Figure 4. The 5 A's of Smoking Cessation



Figure 5. Average GPS scores**GLOBAL PAIN SCALE (1-100)**

	Smokers (n=7)	Non-Smokers (n=30)
June	32	18
July	30.2	19
August	30	18
September	36.5	19.5
October	26	27
November	24.75	21
Average	29.9	21.0

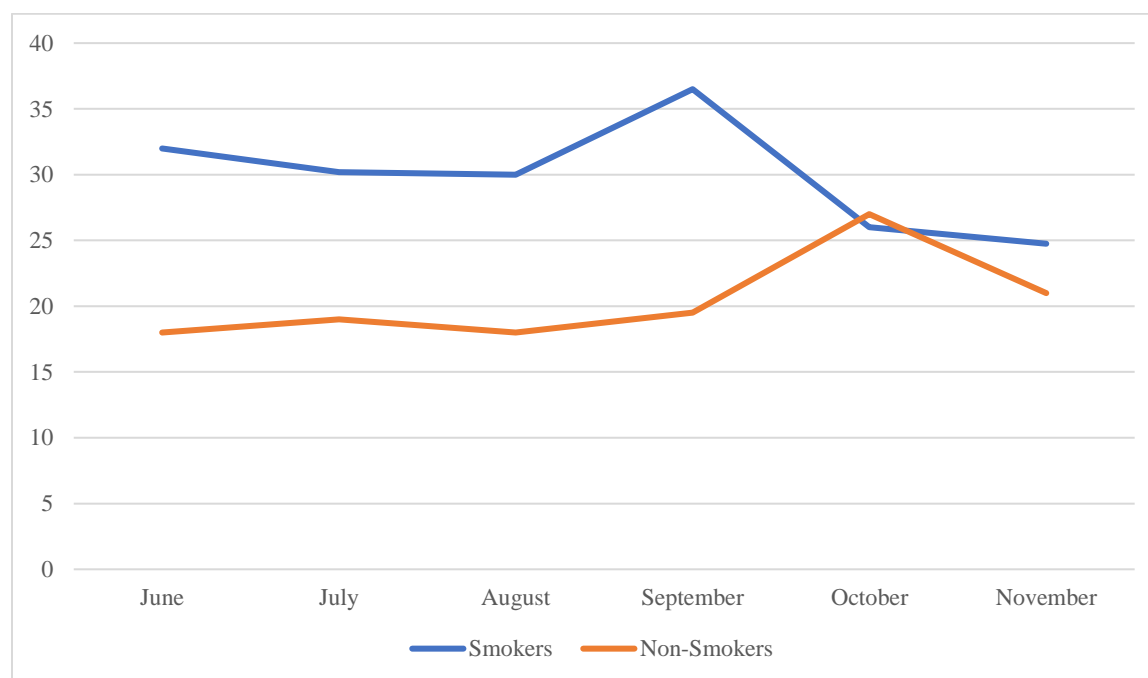


Figure 6. Average Pain at time of Appointment (1-10)

Month	Smokers (n=7)	Non- Smokers (n=30)
June	6.75	5.5
July	6.4	5.7
August	6.75	5.6
September	7.5	5.4
October	6.25	6.1
November	6.75	6.4
Average	6.73	5.79



Figure 7. Pain Location

Location	Total	Smoker N=7	Non-Smoker N=30
Legs	15	5 (86%)	10 (33%)
Back	13	3 (43%)	10 (33%)
Shoulder	11	2 (29%)	9 (30%)
Feet	10	1 (14%)	9 (30%)
Ankles	5	1 (14%)	4 (13%)
Arms	5	1 (14%)	4 (13%)
Neck	5	1 (14%)	4 (13%)
Hips	4	1 (14%)	3 (10%)
Abdomen	2	1(14%)	1 (3%)

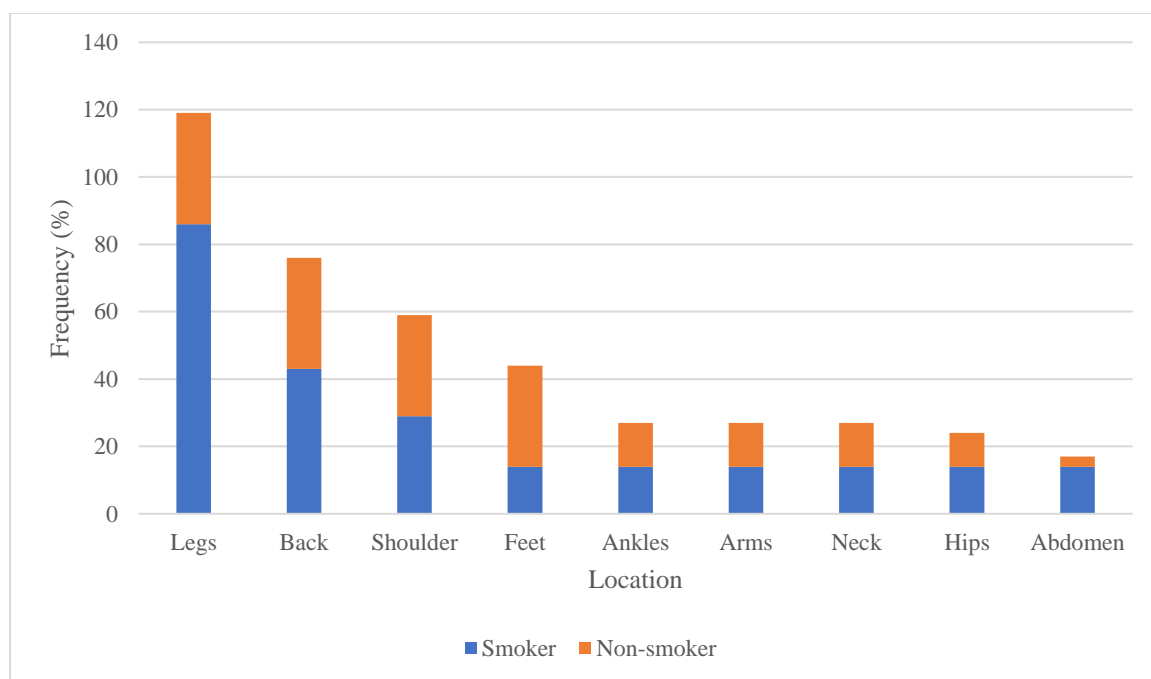
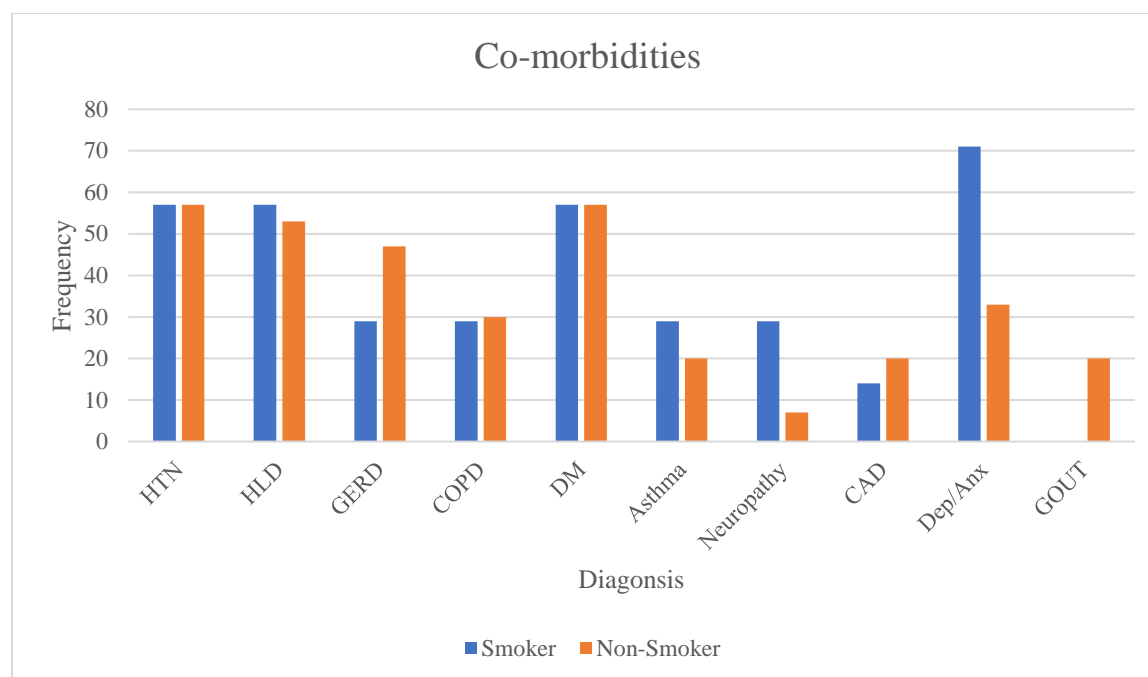


Figure 8. Co-morbidities (n=37)

Dx	TOTAL (n=37)	Smoker (n=7)	Non-Smoker (n=30)
HTN	21 (57%)	4 (57%)	17 (57%)
HLD	20 (54%)	4 (57%)	16 (53%)
GERD	16 (43%)	2 (29%)	14 (47%)
COPD	11 (30%)	2 (29%)	9 (30%)
DM	21 (57%)	4 (57%)	17 (57%)
Asthma	8 (22%)	2 (29%)	6 (20%)
Neuropathy	4 (11%)	2 (29%)	2 (7%)
CAD	7 (19%)	1 (14%)	6 (20%)
Dep/Anxiety	15 (41%)	5 (71%)	10 (33%)
GOUT	6 (16%)	0	6 (20%)

Figure 9. Diagnoses

Diagnosis	Total N= 37	Smoker N=7	Non-Smoker N=30
Arthritis	11	3 (43%)	8 (27%)
DDD	2	1 (14%)	1 (3%)
Generalized pain	9	4 (57%)	5 (16%)
Arthropathy	3	0	3 (10%)
Neuropathy	3	1 (14%)	2 (7%)
Cervicalgia	2	0	2 (7%)

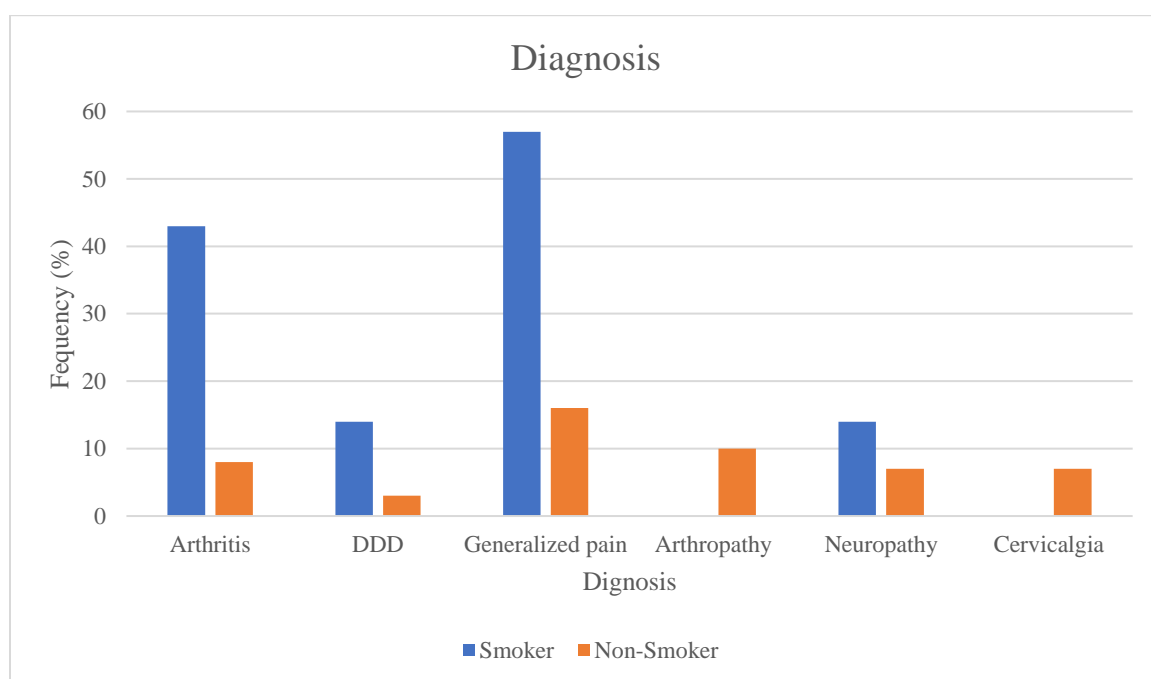
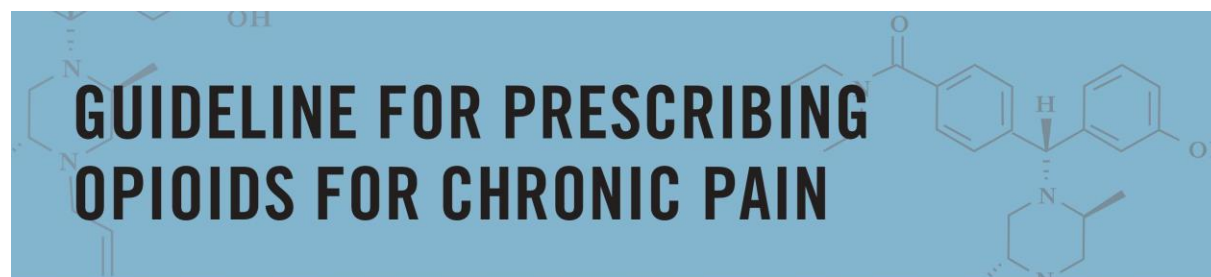


Figure 10. CDC Guideline for Prescribing Opioids

IMPROVING PRACTICE THROUGH RECOMMENDATIONS

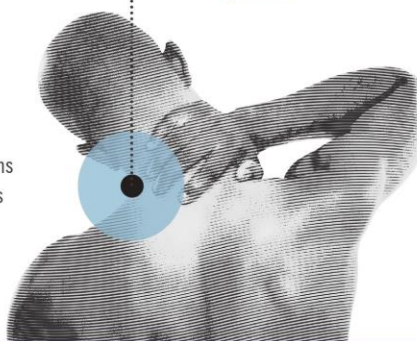
CDC's *Guideline for Prescribing Opioids for Chronic Pain* is intended to improve communication between providers and patients about the risks and benefits of opioid therapy for chronic pain, improve the safety and effectiveness of pain treatment, and reduce the risks associated with long-term opioid therapy, including opioid use disorder and overdose. The Guideline is not intended for patients who are in active cancer treatment, palliative care, or end-of-life care.

DETERMINING WHEN TO INITIATE OR CONTINUE OPIOIDS FOR CHRONIC PAIN

- 1** Nonpharmacologic therapy and nonopioid pharmacologic therapy are preferred for chronic pain. Clinicians should consider opioid therapy only if expected benefits for both pain and function are anticipated to outweigh risks to the patient. If opioids are used, they should be combined with nonpharmacologic therapy and nonopioid pharmacologic therapy, as appropriate.
- 2** Before starting opioid therapy for chronic pain, clinicians should establish treatment goals with all patients, including realistic goals for pain and function, and should consider how opioid therapy will be discontinued if benefits do not outweigh risks. Clinicians should continue opioid therapy only if there is clinically meaningful improvement in pain and function that outweighs risks to patient safety.
- 3** Before starting and periodically during opioid therapy, clinicians should discuss with patients known risks and realistic benefits of opioid therapy and patient and clinician responsibilities for managing therapy.

CLINICAL REMINDERS

- Opioids are not first-line or routine therapy for chronic pain
- Establish and measure goals for pain and function
- Discuss benefits and risks and availability of nonopioid therapies with patient



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